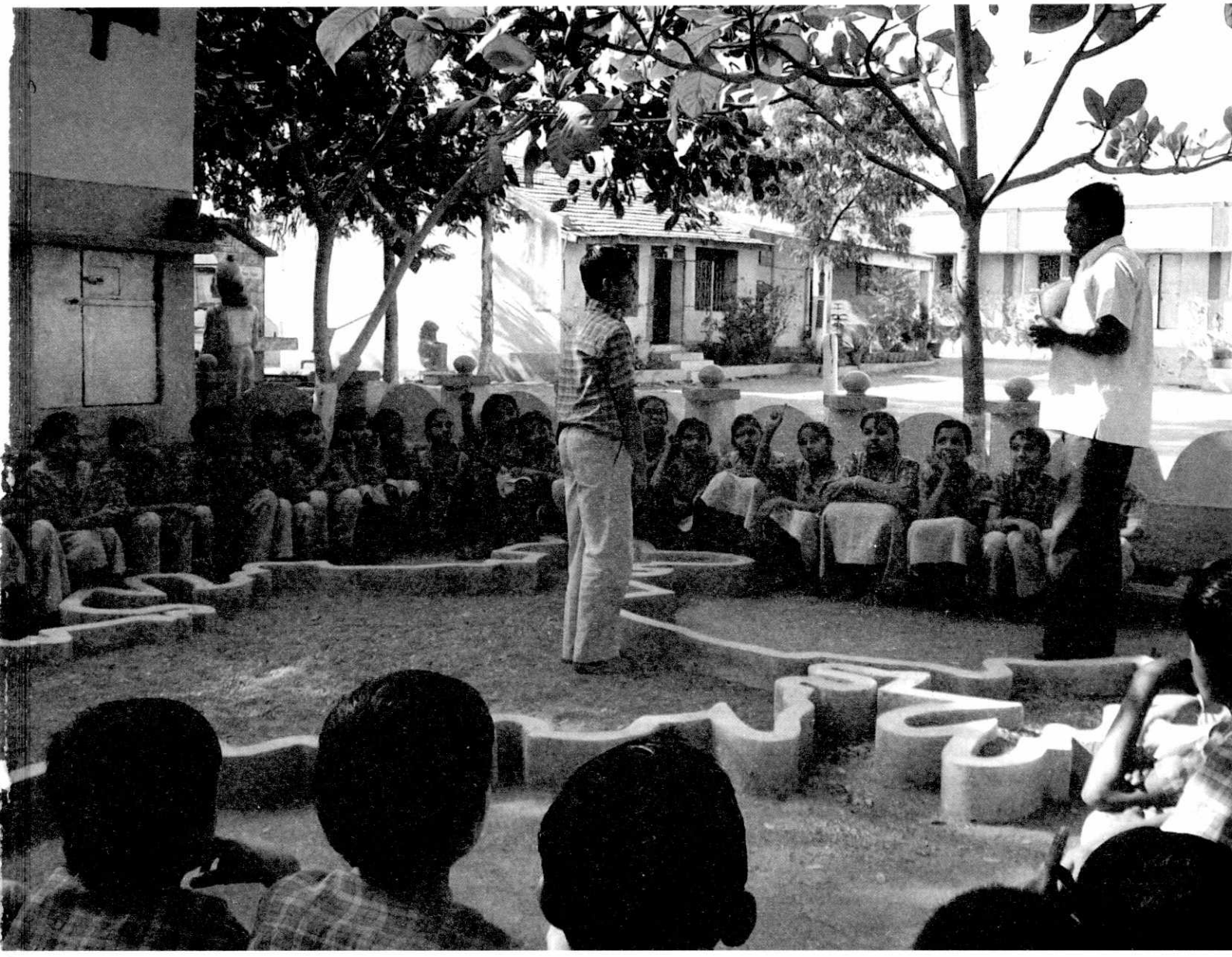
Effectively using BaLA (Building as Learning Aid) in Elementary Schools

A Teacher's Manual



Conceptualized and Developed at
VINYĀS
Centre for Architectural Research & Design

bâlâ
building as learning aid

Document Development and Design team of Vinyās

Design of Educational Activities using BaLA ideas

- Ruth Rastogi, Teacher, Teacher Trainer and Pedagogue
- Dinesh Rastogi, Teacher, Teacher Trainer and Pedagogue

Editing of Text, Document layout, graphic development, photography and their selection

- Taranjeet Kaur, Project Architect
- Vibha Gupta, Project Architect
- Kabir Vajpeyi, Principal Architect

Interface of Architecture and Pedagogy

- Preeti Vajpeyi, Architect and Urban Planner - Honorary Consultant

Document Composing and layout

- Sumit Graphics and Shabd Sanyojak

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The Head, BaLA Team
Vinyās, Center for Architectural Research and Design
C-60, Anupam CGHS, B-13, Vasundhra Enclave, Delhi - 110096, India.
Phones: 011-22628151, 22625747 (Tele fax)
e-mail: vinyascentre@yahoo.co.uk

कपिल सिब्बल
KAPIL SIBAL

मंत्री
मानव संसाधन विकास
संचार एवं सूचना प्रौद्योगिकी
भारत सरकार, नई दिल्ली . 110115
MINISTER OF
HUMAN RESOURCE DEVELOPMENT,
COMMUNICATIONS AND INFORMATION TECHNOLOGY
GOVERNMENT OF INDIA
NEW DELHI – 110 115

FOREWORD

School buildings have traditionally been conceived and treated merely as brick and mortar structures to house education activity. The interface between the building design and the design of the teaching and learning programme has received scant attention, and the possibility of using the physical space as a learning resource only sporadically explored.

Building as Learning Aid, or BaLA as it is popularly known, is about developing school spaces – the classrooms, the floors, walls, doors, windows, pillars, corridors, the outdoor spaces and the natural environment – as learning resources.

This manual, developed by Kabir Vajpeyi and his team at Vinyas, provides a host of examples of how this can be done: a window grill designed for children to practice pre-writing skills; a range of angles marked on the floor under a door to explain the concept of angles; ceiling fans painted with colour wheels for the children to enjoy ever-changing formations; moving shadows of a flag-pole to act like a sundial to enable children to understand different ways of measuring time.

Inclusive settings and child friendly learning environments in schools need to be established. Children should be encouraged to use school spaces to learn through an activity based process of discovery and exploration mandated under the Right of Children to Free and compulsory Education (RTE) Act, 2009. This will strengthen children's language, communication, numeracy skills, reinforce their observation skills by involving multiple senses in the learning process, facilitate understanding of abstract notions through concrete examples available from the school environment, and develop in children a respect for nature and the environment.

I hope that this Manual will inspire architects and engineers to incorporate BaLA elements in the design and development of school spaces.

(KAPIL SIBAL)

unicef
unite for children

Preface

Building as Learning Aid (BaLA) is an innovation that can help India's schools become more child friendly. UNICEF has been a proud partner in supporting this initiative over the last decade to see how school space, both indoor and outdoor, can be developed as a learning resource. This manual is a timely 'how-to use' resource that can help transform school infrastructure under the aegis of the Right of Children to Free and Compulsory Education (RTE) Act 2009.

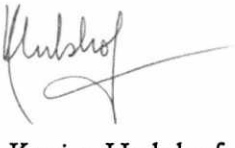
Under RTE, we envisage schools where children can learn and play; schools that are a welcoming environment for children and reflect their local culture. This manual gives specific examples on how this can be achieved. Many of the activities capture the essence of the constructivist pedagogy approach under the National Curriculum Framework 2005, enabling children to use the BaLA settings and learning resources to build their own knowledge.

Equally important is the need to support teachers, parents and education officials. BaLA needs to be complemented by good management and maintenance of school facilities and barrier free access to all children without discrimination. The RTE Act puts the power and responsibility in the hands of local government and School Management Committees to ensure that a child friendly environment that BaLA can create, remains a healthy, welcoming, child-centered setting throughout a child's school progression.

The RTE Act has defined crucial parameters for school development through the infusion of new learning and ideas on design innovations, whole school planning and building schools that are child-friendly. The parameters include an all-weather building consisting of at least one classroom for every teacher and an office cum store, separate toilets for boys and girls, safe and adequate drinking water facilities for all children, barrier free access, boundary or green fencing, kitchen for cooking the Mid-Day-Meal, a library and a playground. Each child should have access to such school facilities within the next few years, so as to facilitate quality learning.

This BaLA manual also provides an opportunity to promote equity through school design and use. This is by giving *every* child, irrespective of his or her background, the ability to use every feature of their school environment easily and freely, without inhibition. It provides creative ideas on how schools can reflect the flavour of the local culture and language and use local resources to make children feel proud of their own culture and practices.

UNICEF is committed to creating child-friendly schools and systems. We hope that the users of this BaLA manual will be able to build quality school environments that will, in turn, help every girl and boy, achieve their potential and make RTE a reality for all of India's children.



Karin Hulshof
UNICEF India Representative

February 2012

Acknowledgements

Vinyās team would like to acknowledge contribution and help of various people and institutions who made this document a reality.

We are grateful to the Honourable Human Resource Development Minister, Government of India, who has been kind to write the Foreword for the document. We are also grateful to Ms. Anshu Vaish, Secretary School Education and Ms. Anita Kaul, Additional Secretary, Department of School Education and Literacy (DoSEL), Ministry of Human Resource Development (MHRD), Government of India, who have seen and supported BaLA intervention in various capacities in past several years. We thank UNICEF India Representative Ms. Karin Hulshof to kindly write the Preface and Ms. Urmila Sarkar, Chief Education India Country Office for bringing out this publication. UNICEF Education Section for supporting the entire initiative – from conception of BaLA, way back in 2000-2001 and later in developing this document for teachers. Initially, Ms. Chetana Kohli, Mr. Vivek Ramchandani and later Ms. Sara Poehlman, Mr. Binay Pattanayak and now Mr. Ramachandra Rao Begur, Mr. Venkatesh Malur, Ms. Bhuvaneswari Mahalingam, Ms. Teresa Andrady, from UNICEF Education Section, have all contributed significantly in this endeavour. Shri Virender Singh, Deputy Secretary and Shri Arun Sharma, Under Secretary, DoSEL for facilitating various processes in the Ministry of HRD. We acknowledge their contribution.

We would like to thank various State Project Directors of SSA, State Pedagogy Experts, State Project Engineers, Civil Works Coordinators, District and Field Engineers, District, Block and Cluster level Coordinators, School Head Masters, School Teachers and Children who have implemented and used BaLA across the country (in urban as well as rural and even in most remote tribal areas) and contributed indirectly in providing opportunity to Vinyās to document as well as use the learning in this document. Many non-government and private schools which have implemented BaLA have also contributed in the same way. These States, Programmes and Schools are listed below. Much insight into effective usage was gained through the Teacher's training programmes conducted in these States and Schools, which has been used in this document. We gratefully acknowledge the contribution of all.

Many of these programmes were supported by SSA (MHRD) as well as State / UT Offices, UNICEF State offices in Delhi, West Bengal, Orissa, Rajasthan and Chhattisgarh, Rajiv Gandhi Foundation in Jammu & Kashmir and Karnataka, Jingle Bell School Society Faizabad, IC Trust New Delhi, Aga Khan Foundation, New Delhi. Vinyās would like to acknowledge their contribution.

Vinyās would like to acknowledge following projects / programmes / individuals / documents / books from where many of the photographs shown in this document have been taken:

1. Schools under Sarva Shiksha Abhiyan (SSA) Delhi (under Government of National Capital Region of Delhi)
2. Schools under SSA Gujarat, India
3. Schools under SSA Himachal Pradesh, India
4. Schools under SSA Jammu & Kashmir, India
5. Schools under SSA Karnataka, India
6. Schools under Lok Jumbish Project in Rajasthan, India
7. Schools under New Delhi Municipal Council (NDMC), New Delhi, India.
8. Schools under SSA Orissa, India
9. Schools under SSA Rajasthan, India

10. Schools under SSA West Bengal, India
11. Jingle Bells Nursery School at Faizabad, Uttar Pradesh (under Jingle Bells School Society), India
12. IC Trust Jagriti Public School at Katna village, Murshidabad, West Bengal, India
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18. Photographs by Late Shri Jugnu Ramaswamy at IC Trust, Jagriti Public School, West Bengal, India
19. Compost Pit photo by Collin Anderson

Books & Documents:

20. Building as Learning Aid by Kabir Vajpeyi, 2006
21. Aditi – The Living Arts of India by The Handicrafts and Handlooms Export Corporation of India Ltd. (HHEC), published by National Museum of Natural History, Smithsonian Institution Press, Washington, D.C. in 1985
22. The Language of Symbols by Archana, published by The Crafts Council of India
23. Community Movement for Sanitation & Dignity by Unicef
24. Curriculum books from Uttar Pradesh by Subir Shukla
25. Images of Infinity by Rey Hemmings & Dick Tahata, Published by Leapfrogs Group,1984
26. The Blackboard Book by Eleanor Watts, published by Sangam Books (India) ltd,1997
27. Thumbprints by Arvind Gupta, published by Bharat Gyan Vigyan Samithi, 2002
28. Joy of making Indian toys by Sudarshan Khanna, published by National Book Trust, 1992
29. 5000 Design and Motifs from India by Ajit Mookerjee
30. Colour Perception by Tim Armstrong, published by Tarquin Publications,1991.
31. पत्तों का चिड़ियाघर – by Arvind Gupta, published by Bharat Gyan Vigyan Samithi, 2003.
32. मेरी दस उंगलियां – by Arvind Gupta, published by National Book Trust, 2001.

Original source of visuals / graphics of certain ideas could not be found. Vinyās will appreciate if the readers of the book could inform us about their original source, so that they can be duly acknowledged in the next edition, and mail it to: vinyascentre@yahoo.co.uk

We look forward to the School Principals, Headmasters and Headmistress, Teachers to use this manual in their lesson plans, undertake activities with children and make full use of the learning resources created.

We also look forward to share your experiences and comments to improve future editions of this manual.

Kabir Vajpeyi
Principal Architect, VINYĀS

25th February, 2012

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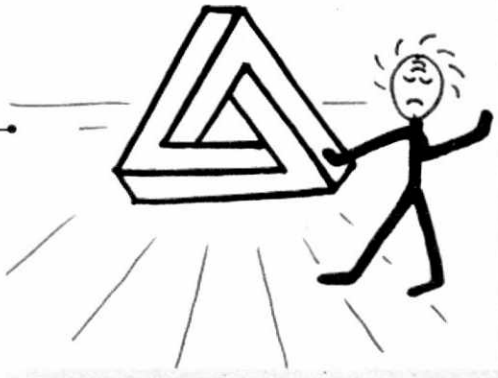
How to Use this Manual?

Typical format for the teaching-learning activities described in this manual is as follows:

Introduction: *This introduces the concept and describes the purpose of this idea / activity(ies).*

Name of BaLA idea → **05 Visual Illusions**



A representative visual depicting the BaLA idea

Introduction

What are visual illusions on walls?

Children and all of us are fascinated by optical illusions. We stop in our tracks when we see visuals that do not follow patterns we see in our daily life. They arouse our curiosity. Can this be possible? It certainly has been possible to draw it. Do our eyes deceive us? They impel us to look at pictures or situations in a very different way.

What is happening here?

Suggested Activities: *This gives the overview of the various activities*

Suggested Activities

1. Exploring and Discovering Visual Illusions.
2. Sharing the Visual Illusions with Others.

Teaching-Learning Activities: *This contains various activities along with classes for which they are useful. It also has photographs to explain the activity*

Teaching-Learning Activities

Activity 1: Exploring and Discovering Visual Illusions

All classes

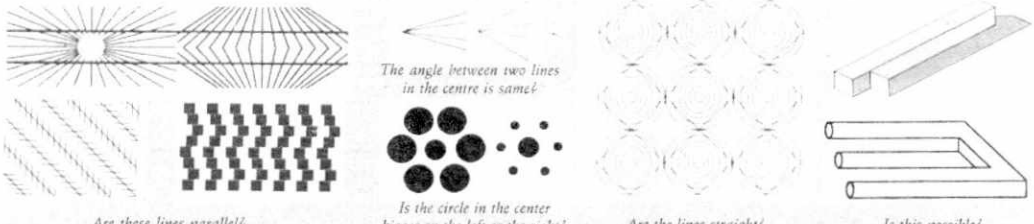
There are two types of illusions - Impossible illusions and Deceptive illusios. Children can be asked to explore these visual illusions and encouraged to discover the science behind it. This can be done by using mearusing scales, discussions with peer groups and teachers.

Activity 2: Sharing the Visual Illusions with Others

All classes

Children can be asked to find more such illusions in children□s magazines. These can be hung on pin-up boards as a source of stimulation and enjoyment. If you use internet, there are many visual illusions that can be downloaded from the internet and printed out, including ones that seems to move. These can be hung on display boards and enjoyed.

General Graphics / Photos with captions to get ideas of space or other possibilities to make, locate or use this BaLA idea



44 b:la

A typical page fold out

Variations of main BaLA idea

Teacher's Role: *This describes the specific role of the teacher towards the activities described*

Objectives: *This describes the specific objectives of the activities enumerated*

⇒ **Impossible Illusions**
⇒ **Deceptive Illusions**

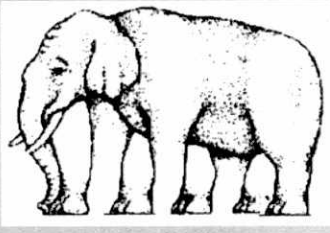
Teacher's Role

As teachers we need to constantly introduce children to magic and wonder in the world.

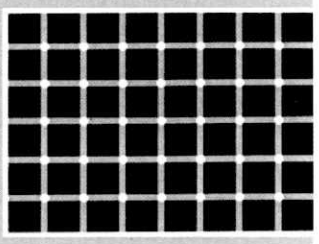
Impossible and Deceptive Illusions can easily be painted on walls or on doors or in cosy corners where children play outside.

Objectives

1. To arouse curiosity.
2. To sharpen visual perception.
3. To understand that our senses can play games on us.
4. To have fun sharing and discussing.
5. To experience and promote divergent and lateral thinking.
6. To develop positive dispositions towards school as a stimulating and enjoyable place.



Impossible illusion



Deceptive illusion

Overview of BaLA idea and activities

Space for Notes:

Space for notes: *This is blank space for teacher to take notes and give feedback*

Teaching Learning Activities for different classes and to record notes and innovations

Children using illusions in a corridor space

Introduction and Overview

Introduction for Teachers:

Many schools under Sarva Shiksha Abhiyan (SSA) as well as several other schools run by private organisations or NGOs have made BaLA elements in their schools. This manual will help teachers and head teachers to plan educational activities in effectively using the learning resource created.

Those teachers who have had training to use BaLA elements will realise that there are hundreds of activities that can happen with the built-in teaching-learning aids in and around their school. This manual will reinforce whatever you have learned during training.

As you teach, you will need to consider how BaLA can be used with your lesson. For example, children must come to see the many patterns in science and math. The Dot Boards, the Grid Boards, the Tangrams, the Calendars, the Magic Squares can be used to depict many, many kinds of patterns. Children, thus, become sensitized to noticing patterns in their lives. After all what do good scientists do? They are keen observers who notice and understand patterns and connections.

Children need many real experiences in language, art, science, math, and geography. Your BaLA elements will facilitate this learning. Without real, concrete experiences, children cannot learn. For example, there are many different kinds of "sour"- the 'sour' of a lemon, the 'sour' of curds, the 'sour' of tamarind, the 'sour' of oranges. Can any textbook or teacher explain these different types of "sour" without having the real experiences?

BaLA is a tool for you to promote learning, curiosity, care and concern, wonder and lifelong learning. It will help children to practice and revisit concepts. It also helps learning to take place everywhere - in the classroom, the corridor, the varandas, the outdoors, etc.

We sincerely hope children will have fun while learning.

You may need to explain to the parents the value of games. Games also have patterns and children need to be able to understand these patterns, develop strategies in order to win, learn to obey rules, be a graceful winner and loser. Children are in a "state of heightened alertness" (Katz) when they play and carry through with their own activities. They also develop positive attitudes to school and learning. It is this alertness and meaningful education that we as teachers need to promote in our schools.

Key Issues for Consideration

1. To understand how children learn?
2. To help teachers use BaLA elements as Teaching - Learning materials

3. To understand the importance of the teacher and promote effective teaching and learning
4. To provide children many opportunities to develop curiosity, creativity, communication skills, academic skills, confidence, co-operation, competence, care and concern
5. To bring beauty into the lives of children and teachers
6. Innovation to develop many more activities using the BaLA elements in your school
7. To take responsibility for care, maintenance and repair of BaLA elements
8. To understand safety concerns
9. To consider donations and parental involvement
10. To consider cleanliness and garbage management
11. To use the world around you to teach and learn

Understanding 'How children learn?'

Understanding how children learn is very important so that age appropriate, child-centred learning experiences can be created for the child. Often, there is a wide gap between what is being 'taught' by the teacher and what is being 'learned' by the children. As per NCERT (National Council of Educational Research and Training) research, following are the ways children learn:

- Children learn better *if their new learning is based on previous experience*. This may vary from child to child in terms of quality and quantity. Their diverse learning experiences must be respected to give them a sense of self esteem and confidence.
- Children *construct their own knowledge from their experiences* and do not just imbibe knowledge handed over to them.
- Children learn better *if more than one senses are involved* in the learning activities. Opportunities for sensory stimulation (smelling, touching, tasting, hearing and seeing) need to be provided through a variety of experiences.
- Children *learn all the time* and not just within the four walls of the classroom. It is a continuous process taking place all the time, in the class room, on the playground and beyond.
- Children learn not just from the teacher but *also from interacting with other children*, and therefore need to be provided with opportunities for cooperative learning through peer group.
- Children learn better if they are *allowed to learn at their own pace*. Children do not learn at uniform pace. They also learn by themselves.
- Children *do not learn in a linear way but in a spiral way*. Their learning would be better if they are given opportunities to come back to the same concept from time to time, maybe in a new format, so that their learning gets consolidated.
- Learning is more effective where the *content is interesting and captivating* and teaching- learning is *joyful*.
- Children's learning proceeds from *concrete to abstract*, from *familiar to*

unfamiliar and from *general to specific* and from *whole to parts*. Children therefore need to be given a lot of concrete experiences and examples to help them arrive at conclusions, rules and principles. Children at the primary stage learn through repetition. Hence there is a need to provide for practice, but not monotonous repetition, since it can be boring. A variety in learning experiences should be provided.

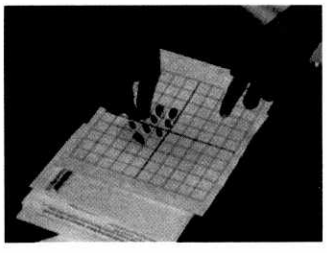
- Children learn in *a holistic way and not in a segmented way* or compartmentalized way. Learning, therefore, is more meaningful if it is integrated.

Using BaLA Elements and The Role of the Teacher

Though many BaLA elements can be used in different self-learning situations by the children, teachers can use the BaLA elements very creatively to meet the various learning needs of the children. A caring and creative teacher will bring the built elements alive by giving exercises, using the abacus, or the map in the playground. It is the teacher who shows children how to write properly on the lines. It is the teacher who will expand the concept of 'Me and My World'. It is the teacher who will use the Grid Boards. It is the teacher who will explain uses of the 'Dot Boards' or the 'Vertical and Horizontal Scales' or the 'Calendars'.

BaLA elements will make the school more enriched. However, that is not the only intention. The 'Goltara' must be used; new words must go onto the 'Word Wall' on a daily basis; the door and window angles must give concrete examples to the lessons. Fractions in the environment will help to bring lessons alive.

The writing surfaces can be used to share proverbs, jokes and riddles. These surfaces allow a child to create whatever she pleases. As teachers you simply need to encourage these *open-ended activities* by making sure that chalk and duster are available and appreciating the drawing, or the writing of children.



Some of the activities need formal lessons, such as the study of planetary orbits and fractions. Other activities require the teacher to gather materials, encourage children to gather materials and then encourage them to use materials in their own creative ways.

Other activities are in the playground and corridors for games of strategy, hide and seek, hop scotch and number lines. The teacher may need to teach a few games and children will then play by themselves.

Many activities are open-ended to support creativity and initiative of children. Fantasy play in the shop or doll play under the trees, beside the Mystery Wall or in shady corners, needs to be recognized as supporting an important aspect of child development. Children need to be alone or in groups from time to time. Talking is a part of learning and must have the approval of the teacher.

During your training you may also devise new activities for the BaLA elements. This manual gives only some suggestions. It is important to continually develop new concrete activities that can enhance your lessons, your thinking and creativity.

BaLA and Teachers

BaLA as loose materials

The BaLA elements in your school are fixed. But we know that children need many loose materials that they can touch and feel and describe. Availability of loose materials also enhances creativity of children.

Many of the BaLA materials have a variety of usages. This could be used for multiple subjects and multiple grades. This makes the 'fixed' seeming BaLA 'flexible', 'loose' or 'open ended'. For example, the format of the calendar is fixed but you can sometimes use it to enter the days, dates and previous months. Sometimes you may want to have children enter the daily temperatures. For some months, you may ask children to mark on the phases of the moon. Also children may observe the multiplication tables of seven. Children could be asked to fill in all odd numbers or other patterns.

Similarly, the vertical and horizontal scales can be used to measure many loose objects in the environment. If you have taught a lesson on measurement, you can divide children into groups and give instructions to measure objects in the school yard. These measurements can be done independently by children and recorded on writing surfaces. Next time you can ask them to measure immovable objects. How will they do this? Thus you see, that many loose materials are needed. BaLA elements and loose materials go hand-in hand.

Another example is the Goltara. It is fixed but can be used with chalk, stones, dice and for many more different types of mathematical operations and language activities. Soon children will also make up other games. There is space for notes on innovations that you make when you use the maps, grid boards, weighing scales, dice etc. We would like to hear from you about the activities that you do with your class.

Class Management, Time Management and Constructive Engagement of children with BaLA

You know that all children do not learn at the same pace. Many times you need to give children individual attention. You also need to work with children at their present level of understanding. You will also have children who need more challenges. Separate work at their level of understanding can be done on the BaLA elements.

With BaLA elements you can give extra practice or more challenges to children. Also when you give two or three children extra attention, others can be busy playing games that have been made on the floor. Or, you may want some children to consult their atlas and then build the mountain ranges of South India, in the sand. The possibilities are numerous.

You can find puzzles in *Chakmak* magazine and let the child complete these puzzles on the Grid Board. Or they may be asked to copy a local song from home, then write it on the writing board and teach it to others. A child in class 4 can teach phonic blends to children in Class 2 (Example: Ask Sumit who is in class 4 to sit with Class 2 children and find words that start with "bl". The children will answer and Sumit will copy these words on the board and ask children to read them. Then they can find words that start with "pl" and so on.)

You need to have time to talk to children, individually and in small groups. With BaLA, other children can be busy and constructively engaged in other projects. The children who are working independently in groups also are learning to manage themselves and work together. Of course, you must remember to later discuss their work with them as they love to explain what they have achieved.

BaLA will make your planning and teaching easier. You no longer need to tell children to write pages of handwriting if you leave them unattended when you have to meet the principal or talk to parents.

You can use the Map of BaLA Activities across Classes given in this manual to identify and plan classroom sessions.

Revisiting Concepts

Teachers know that children have to practice concepts that have been taught. One lesson in math or geography or language is never enough.

You will know what math or language concepts need to be practiced. Also you know that all children do not learn at the same pace. You can use the BaLA elements to give problems to children so that they can practice and review work that has been done in class.

Similarly the ability to read and enjoy literature is very important. Children can practice reading when you post funny jokes on the BaLA writing surfaces. Sometimes you might ask a child to write a poem on the board. Or children can be asked to write a short story. Other children will enjoy reading these stories, poems, jokes or riddles. It is extremely important to have a book corner where children can go and freely pick up books to read. Children will be gaining competence in reading, writing and math in a joyful manner.

Teachers must have good resources in their school. They can share materials from SCERT, Eklavya, NCERT and National Book Trust.

Beauty in Your School

Before

After

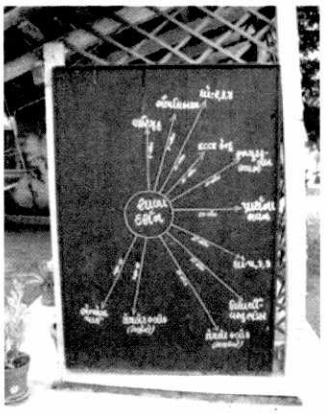
Children respond to beauty. They treat their environment with respect if it is neat, clean and comfortable. We all feel very peaceful if we are comfortable.

Trees, flowers and other greenery must be in every school. If your school lacks trees, plant some fast growing species that will give shade in two years. Vines also grow quickly and can cover a part of the veranda. In the meantime put potted plants around to make your school a pleasant place to be. Also plant slow growing species that will give pleasure for generations.

Seating areas in shady corners, under tree, or beside a *jaali* wall, give children cosy comfortable areas to play games or chat with friends or eat tiffin.

You do not need to have too many painted surfaces, to make a school attractive. Too much colour is distracting. The children's art work, craft work, construction work and writing on the surfaces will add colour and let parents and community know that active learning happens here.

Innovation



Many teachers who have BaLA elements in their school have shown their creativity and ability to innovate. There are hundreds of uses for the Grid Board and the Dot Board. Everywhere Me and My World has been found to be creatively and differently completed. Now teachers are moving forward and using these circular lines to express new ideas.

For Milestones, teachers have suggested that a milestone can be erected or written beside the gate of the school or painted on the wall. As children leave the school, they learn the various distances in their habitat. A map of the community and habitat can also be on the wall beside the gate.

Opportunities for Learning

The teacher needs to focus on the *process of learning* – not the answer. It is important to know how children arrive at their answers. It is important to have many discussions as children gain true concepts and understanding by talking and doing, not by being told.

It is *important to share* rather than compete. Do you want neighbours and friends who share joys and sorrows or do you think that children learn by competing? All your students need to feel successful. You are there as a teacher to guide and help all students.

Do you have a vision for your society? If you do, then *this vision must be*

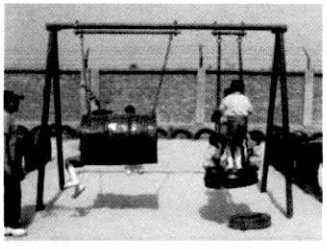
lived on the school premises. Please understand that we only learn by making mistakes. When children make mistakes then you know where they need further help and guidance. Do not scold them. Give children *time to find solutions*. Do not only give answers.

Practice is required once children understand concepts. Do you give time to practice and re-visit the concepts?

Care, Maintenance and Repairs

All buildings, chalkboards and BaLA elements need regular care, maintenance and repairs. A schedule needs to be set up for this. Is it possible to use the school maintenance grant available for this? Will parents and children help? Are donations required? What needs to be maintained monthly? What requires yearly attention?

Safety Concerns



Safety is extremely important. Do not have any rough edges or protruding bolts and nails that can harm a child. The Mystery Wall should be challenging but not too high. Timely repairs to swings and slides must happen. Swing seats must be made of tyres, not made of wooden or steel boards that can seriously injure a child. Put a wall of tyres in front of swings so that little children do not walk in front. Provide fine sand bed in play areas for jumping and swinging.

Donations and Parental Involvement

The school belongs to the community and parents must be involved. Many parents may not understand how learning happens. As teachers you need to explain the many ways in which children learn and develop.

There is a great need for tools, library books, collections for the fantasy center, art center and science center. Can parents raise funds, if the budget is finished? Can parents donate time to repair the roofs or walls?

Children are very happy when they see that parents care for their school. It helps them realize the importance of school and raises their confidence and self-esteem. We need to take pride in our community and community institutions.

Cleanliness

Sometimes a sweeper cleans the school. Is this enough? Our closets, shelves, decorations, need to look neat and presentable. The library and all tools and materials must be stored in an orderly manner so that they are usable. The chalkboards must be clean and ready for use the next morning. Who will do this? All teachers and children will need to help.

What systems have you devised for cleaning?
Then we need to consider garbage. Where does it go? Does it look nice behind the school, or on the street? Is there a way to segregate the garbage? If garbage is useful it can be put in a special bucket which is given to a rag picker. If it is grass and leaves, do you have an arrangement for composting? If it is useless is there a pit to bury it in? *Never, never burn garbage.* Do you know why? Where will you find the answer to this question? Refer to the activities under Zero Garbage.

Use the World Around You to Teach

Our country as well as the state is huge with many different environments. Cities, towns and villages are different. So is the geography. You may live by the seaside, in the desert, or in forests or in the hills. Your culture and language may be different. Occupations are many and varied.

The National Curriculum Framework (NCF) 2005 states that teachers must teach concepts using the child's environment. The environment is familiar and can be understood. Young children learn only in concrete ways using their senses. Language can be taught using familiar poems, songs, games and stories. Science can be taught using familiar plants, animals and food. Math can be taught using leaves, stones, and seeds. Use the textbook only as a guide. If children have to learn about a doctor, then take them to visit a doctor's clinic. If they are studying tools, it is best to study the tools of the local *cyclewalla* or shoe man or carpenter. We can even study tools used in the kitchen. The world of BaLA in your school is an aid to represent the understanding that children are gaining of the world around them.

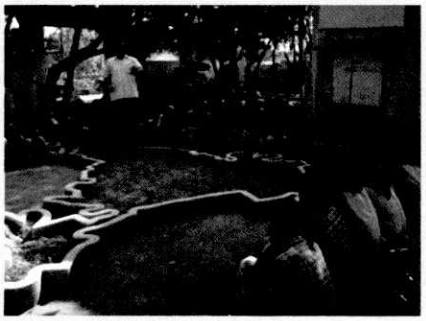
This manual assumes that your school has already implemented BaLA elements as per the comprehensive design and specifications developed by Vinyās. However, if your school hasn't done so, the manual will help you to plan and make these BaLA elements such that you can ensure its effective use.

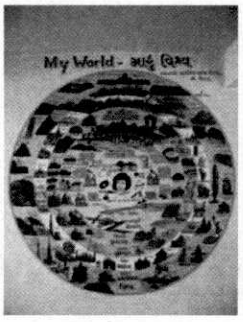
In this manual there is *Space for Notes*. It is important for us to know what new innovations you have made. Keep notes and photos and let us know what activities you did with the BaLA elements. Your feedback will be important to improve further.

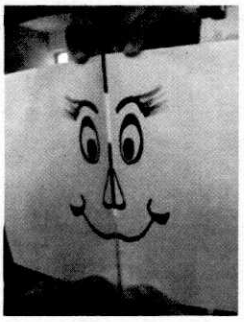
The BaLA Team at VINYĀS

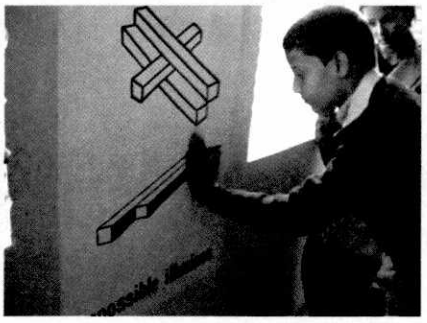
February, 2012

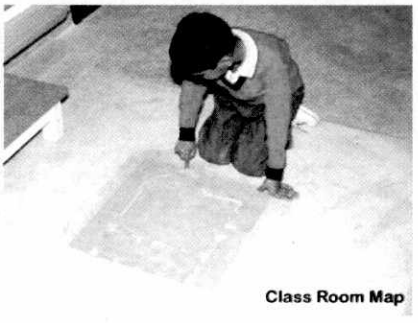
Teaching Learning Activities with BaLA Elements



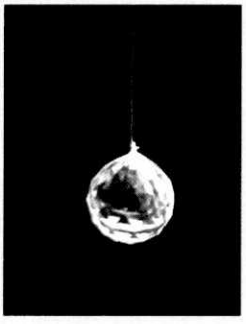


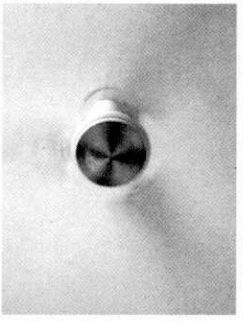


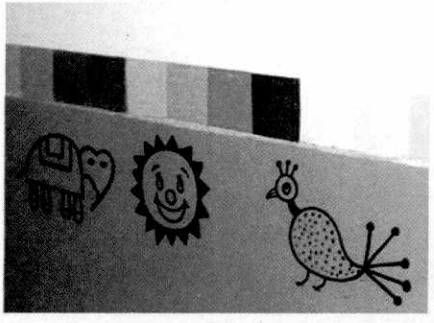


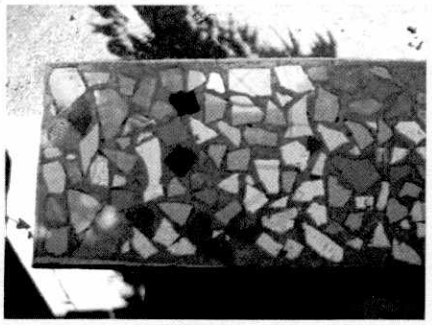


Class Room Map









Section **A**

Understanding the Physical World Around Us

Within the complex physical world around us, there are objects and life forms which offer a variety of shapes, sizes, weights, colours, textures, patterns and images. These objects and life forms are also connected to each other through relationships of use, location or common features. Many of these are inherent part of the built environment. The design ideas in this section provide tools and experiences for children to use while exploring, organizing and trying to understand the diversity in the physical world all around them.

01 Classroom Map and Outdoor Map

Introduction

Mapping is an abstract concept. How can a large area be represented on a flat chalkboard or a piece of paper? Children slowly become aware of different distances and spaces in their home and school. You must start with familiar places like the room and the schoolyard.

Objectives

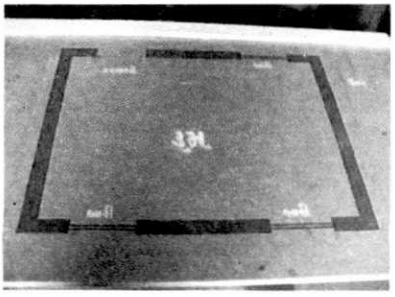
1. To understand the concept of mapping using familiar objects and places.
2. To come to understand the idea of scale, orientation (north, south, left, right).
3. To learn to use the horizontal and vertical grid lines as a reference.
4. To understand that prominent landmarks and distances can be marked on paper.
5. To understand that maps are drawn looking from the top or from the "sky".
6. To understand use of maps to depict roads, rivers, bus station, railway lines, historical places, and geographical features.
7. To learn how to follow directions using a map.

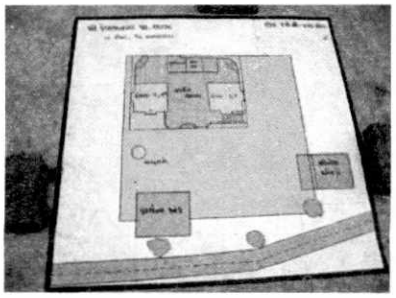
Teaching-Learning Activities

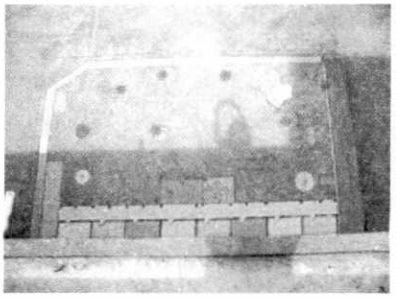
Activity 1: Mapping Objects
Classes I, II, III, IV, V, VI

a) How will you teach children to draw maps looking from the top? First ask children to look at a chair from the front, from the side and then from the top. Then look at a table from the side, from the front and then from the top.

b) Now give the children an exercise to do. Show a bottle and ask them to draw it from the top view.







Start from the familiar spaces around like the classroom, the school...

Teacher's Role

Because map making and map reading is not a natural activity, the teacher needs to have carefully planned exercises that introduce children to the idea of understanding directions, understanding the concept of scale (the classroom can be represented on the teacher's desk) and understanding aerial views. In each room, arrange to have a map of the room. A map of India and a map of the world with in the school premises. Even young children will benefit, if you discuss an event that they see on TV and then point it out on the map.

Arrange to have the map of your village or town painted on the wall just beside the gate. Mark the bus station, hospital, school and all important places of your town. Also mark the directions and scale.

Just beside the school gate make a milestone ZERO with the distances of all important places of your town. Your children will grow up with an accurate idea of distances.

Example:

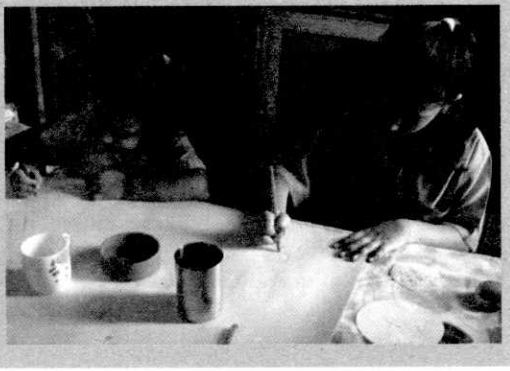
- *Religious Place* *500 m*
- *Bus station* *2 km*
- *Police station* *5 km*
- *Hospital* *5 km*
- *Near by City* *135 km*
- *State Capital* *270 km*

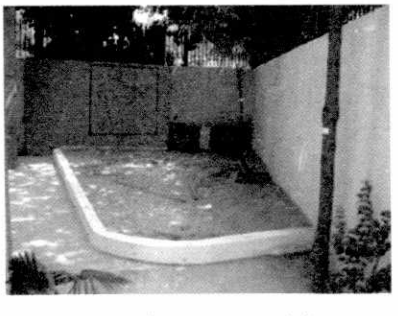
Suggested Activities

1. Mapping Objects
2. Let's Know Our Classroom
3. Let's Know Our School
4. Let's Know Our Village
5. Let's Know Our State and India
6. Drawing to Scale
7. Activity Map in Playground

c) Look at a flower pot (*gamla*) or a pencil and draw it from the top.

d) For homework, ask children to draw the top view of their TV or draw the top view of a cycle. After a few exercises, you can ask them what different views they would like to draw. For example, guide them on the drawn map about location, scale and orientation in relation to the real object. They may say that they want to draw a side.





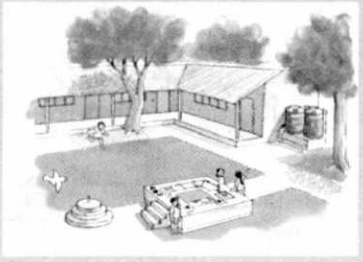
...and then move to more distant places like the map of district, state and the country

Activity 2: Let's Know Our Classroom

Classes I, II, III, IV

Use the map on the teacher's desk to find the door, the windows, the shelves, the closet, the chalkboard, the desks, the table and other furniture. Mark and label these places.


Class Room Map



Activity 3: Let's Know Our School

Classes I, II, III, IV, V

On the outdoor map of the school grounds, ask the children to mark the location of the gate, the pathways, trees, the swings and other parts of the yard. If you do this activity twice a year, you will notice that children's accuracy, observation and estimation of sizes and distances will improve, as they grow.

Activity 4: Let's Know Our Village

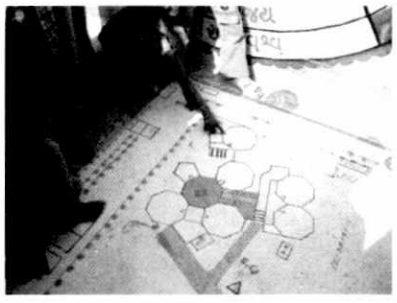
Classes III, IV, V, VI, VII, VIII

Ask older children to draw a map of the road from their home to the school. Mark on crossroads and important places like, the police station or the post office or the village well.

Activity 5: Let's Know Our State and India

Classes IV, V, VI, VII, VIII

Use the Grid Board to draw the outline of our State and India. Children in Class V, VI, VII and VIII can now locate the states, main rivers, mountain ranges, capital cities and so on. They will use the horizontal and vertical lines as a reference. This will also help them learn to use their atlas in a proper manner.



Maps of the school

Activity 6: Drawing to Scale

Classes V, VI, VII, VIII

Once the children of younger classes have experienced the above activities, they will be able to draw their classroom to scale.

This can be done on a graph paper, or on the Grid Board or the Dot Board.

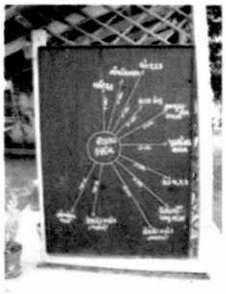
Activity 7: Activity Map in Playground

Classes IV, V, VI, VII, VIII

The large outdoor map in the playground can provide excellent sensory experiences as children create their own mountains, rivers, valleys, plateaus or roads, in sand and mud. NORTH direction on the outdoor map should be the real north, south, east and west, to help children understand directions. In the beginning let the children choose their own play. Then give special projects such as

a) make the mountain ranges of India
b) make the rivers of India
c) make the states of India

Space for Notes:



Activity Map of India in space to play with mud and sand

02 *Me and My World*

Introduction

Me and My World has immense potential to help a child understand her connections to the larger world. The National Curriculum Framework (NCF) 2005, firmly states that children must first understand their own lives and environment. Textbooks must be used only as guide. So first we must study our own world and then learn about the world further away.

Suggested Activities

1. Me and My World Painted on School Walls
2. Me and My World on the Drawing Surfaces
3. Me and My World Expressed in Writing
4. Projects for Me and My World

Teaching-Learning Activities

Activity 1: 'Me and My World' Painted on the School Walls

Classes III, IV, V, VI, VII, VIII

Before painting, teachers will need to spend *one or two months* planning with the children. Discussions about the world around us need to happen. Children then need to draw their world and continue to 'expand' it. You will need to decide what you will depict—agriculture, industry, business, cities, tribal life, animal life, mountains, rivers, history, music, art. As you move to a bigger world, what will you draw? - the neighbouring states? The capital of India? the sub-continent? Will the outermost circle include other countries, the space explorations, satellite communication and other aspects of globalization? When you have made many

Child in the centre, surrounded by the school, neighbourhood, village / town / city, block, districts, State, Country, Continent, World

Teacher's Role

Children are ego-centric. They think that they are the centre of the world. As they grow, they come to understand that there are different points of view even within the same household. Then they come to realize that there are many different kinds of people, occupations, in their own *mohalla* or neighbourhood. As they move to the larger world of the school, they understand that different people have different languages and different food habits. Teachers play a crucial role in helping children come to understand that the world is a beautiful and varied mosaic.

Objectives

1. To understand the world around us.
2. To increase the ability of children to think about and notice the world around us.
3. To avoid the mistake of seeing people and places in a one-dimensional, stereotypical frame.
4. To understand the world as a complex collage of nature, people, places, customs, occupations and languages.
5. To enhance the observation power of children.

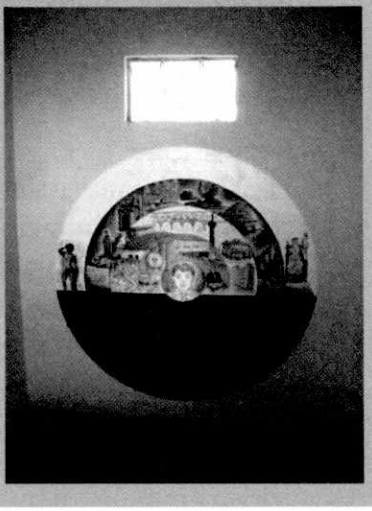
preliminary drawings and have had many discussions, you will then be able to call a sign painter and show him the drawings that have been made by you and the children. Together you as the teacher, along with the children, can plan what is to be drawn and what will be eliminated.

Activity 2: Me and My World on the Drawing Surfaces

Classes II, III, IV, V, VI, VII, VIII

A writable surface can be used to draw Me and My World and complete many special projects through out the year. Each child has a common world and a personal world. The common world would be the school, the village, the roads, the towns, factories and agriculture around them. The personal world would be the family and the extended family and their various occupations. Therefore leaving Me and My World on a writable surface where children can draw their own 'worlds' has much value. The personal world of each child can also be drawn on a poster.

Each school will make a different 'world' depending on the place where children live.



Me and My World on Flag post base

Activity 3: Me and My World Expressed in Writing

Classes I, II

Me and My World can also be used to develop language among young children. Three Circle may be drawn on the writing surfaces on the floor and or walls. Simple topics such as "child and his games", "child and his friends" may be taken up. Those children who are not able to write on their own, teacher may sit with them and provoke them to express their versions. She may write a few words in the circles very neatly. It is important that she speaks the words, not alphabets, while writing. Thus, children will be motivated to pick up chalk and write themselves.

Activity 4: Projects for Me and My World

Classes II, III, IV, V, VI, VII, VIII

You can choose to use the writing surfaces in the class or verandas for these activities. It may be best not to paint in the circles on the board so that the chalkboard can be used for other activities also.

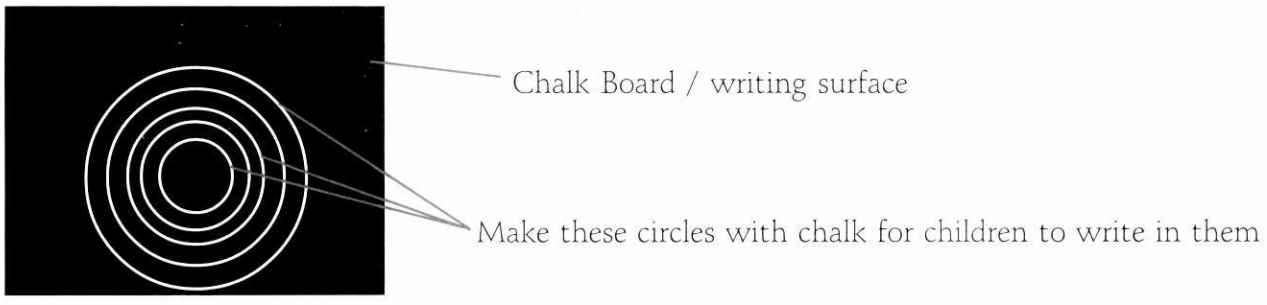
From time to time give different projects on the children's 'worlds'. Children in different classes will respond at their own level of understanding after discussions.

Suggested Projects:

a) Me and my family
b) Me and the birds in my life
c) Me and the foods that we grow
d) Me and the foods that come to our market
e) Me and the places we have travelled to
f) Me and the music of our State, India and the World
g) Me and my festivals
h) Me and the trees around us
i) Me and water in my Life
j) Me and my clothing

As an example take Me and the trees around us

a) The first inner most circle, of course, would be Me.
b) The second circle would be an investigation of trees in the school yard.
c) The third circle would identify trees in the community.
d) The fourth circle would be an investigation of trees from the view of a child a place to climb, a place to hang a swing, a home for birds, squirrels, monkeys, insects, a refuge from the sun....
e) The fifth circle may show wooden items that are in everyone's home and community.
f) The sixth circle may represent trees used in religious events.
g) The seventh circle may investigate trees from a commercial point of view.
h) The last circle may point out the environmental importance of trees.



Using chalkboard for projects for Me and My World

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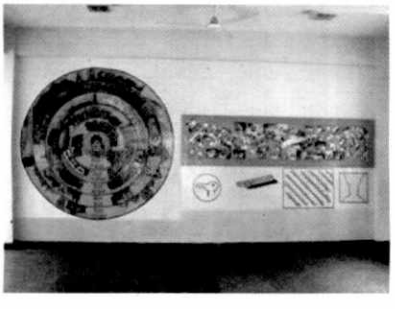
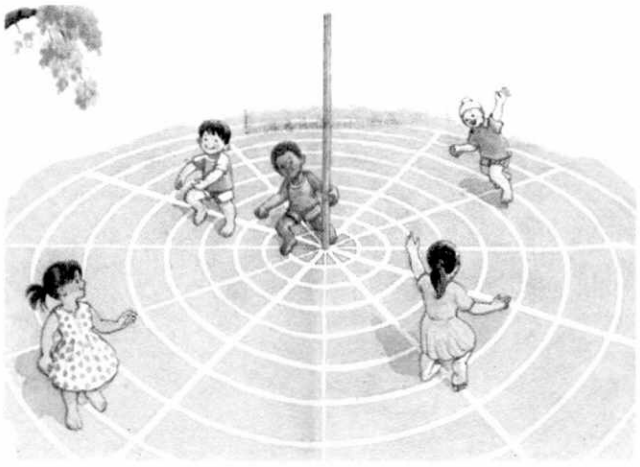


Me and My World will be unique in each school

03 Simple Planetary Orbits



Introduction

Understanding the concepts of the planetary system will be helpful if you do some physical activities. Children always enjoy the circular motions of running around a flagpole or whirling on a merry-go-round.

This activity will help the children understand that planets circle around the sun and at the same time it responds to the need of children to run.

Suggested activities

1. Understanding Planetary Orbits
2. Rotating along the Axis and Around the Sun
3. Earth's Orbit Around the Sun
4. Turning of Earth on it's Axis

Teaching-Learning Activities

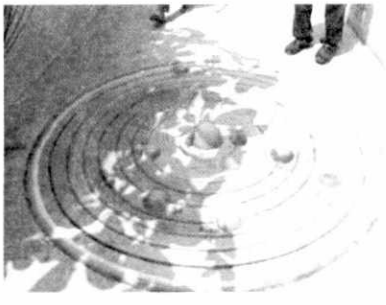
Activity 1: Understanding Planetary Orbits

Classes II, III, IV, V

The children can be given the names of different planets. The names can be pinned on their shirt / blouse. Then ask them to arrange themselves in the order that is in their text. Where will the sun be? Yes, in the centre - the pole represents the sun.

Ask them which planet is closest to the sun? Where will that planet be on the orbit? In this way arrange nine children in the lines around the pole. Ask them to run around the lines. It is important to explain in class that orbits are not circular but elliptical. Of course, much more sophisticated understanding comes in later years, as studies progress.

Orbits on a platform



Multiple use Fraction Disc and Planetary Orbits

Teacher's Role

The teacher will introduce the globe and maps of the world and solar system to the children. Children need to see in an atlas that the planets are not placed equally apart as they are in the play ground. Then proceed to the playground and use the physical planetary orbits.

Is it possible to have a physical demonstration of the distances that are between planets? Make sure that by running around the pole, children should not get the idea that planets are equidistant.

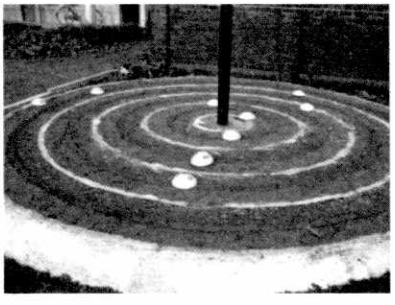
Objectives

1. To understand the revolution of planets in a physical way.
2. To understand that planets revolve around the sun.
3. To understand the meaning of words such as orbit, rotation, revolution.
4. To understand that different planets have different distances from the earth.
5. To understand that the time of revolution for each planetary year is different.

Activity 2: Rotating along the Axis and Around the Sun

Classes II, III, IV, V

To explain the concept of rotation ask the children to keep turning around and around as they make a revolution around the "Sun" (pole). Explain that this rotation gives us night and day. As the children rotate, have them stop. Children will be at different places on the orbits. Then point to the front or side or back of each child and ask them whether it is day or night. Children will realize that the part of their body which is facing the sun will be day while the opposite part of their body will be night.



Orbits marked in a soft ground

Activity 3: Earth's Orbit Around the Sun

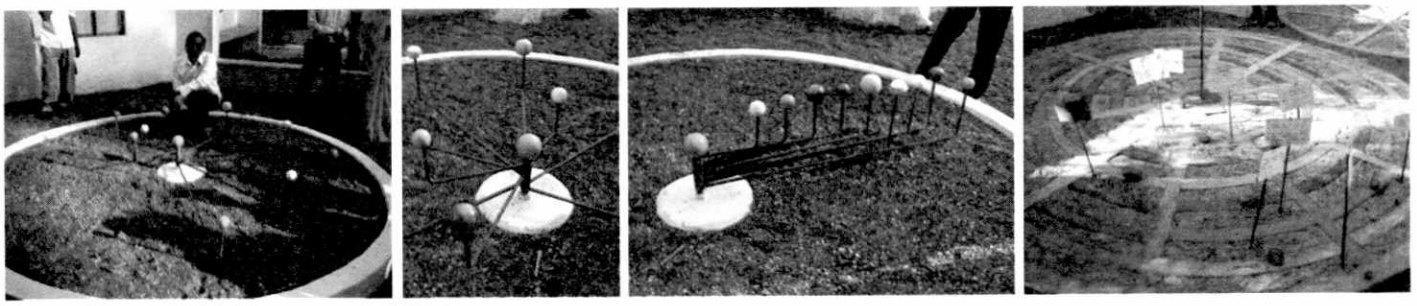
Classes IV, V, VI, VII, VIII

This is an orbit relay game to reinforce the concept of the orbit (rotation and revolution) around the sun.

The children are arranged in two separate circles, each circle facing in. One child becomes the SUN and sits in the centre. A captain is elected for each team and each captain stands ready with a ball in her hands. On a signal each captain starts her team's ball around by passing it to the child on her right hand side. Upon receiving the ball, each child spins around (rotation) and passes the ball on to the next child on the right. *Always turn and pass counter clockwise* as that is the direction of the earth's orbit. As the ball makes a complete circuit back to the captain, she calls, "ONE". The second time around, she calls "TWO". This game continues until the first team to pass the ball around five times, wins.

Discuss this game with the children. The circle of the children, represent the earth's orbit around the sun. The ball represents the earth and its revolution as it moves around the circle. Also since each child must spin around with the ball before passing it on, the concept of the earth's rotation on its axis is made clear.

Space for Notes:



This is a model of solar system

Activity 4: Turning of Earth on its Axis

Classes IV, V, VI, VII, VIII

In this game the children learn about night and day. The children stand in a circle holding hands. One child in the centre of the circle represents earth. As the children hold hands, they chant:

Illery, dillery daxis,

The world turns on its axis.

Isham, bisham bay,

It turns from night to day.

Variation

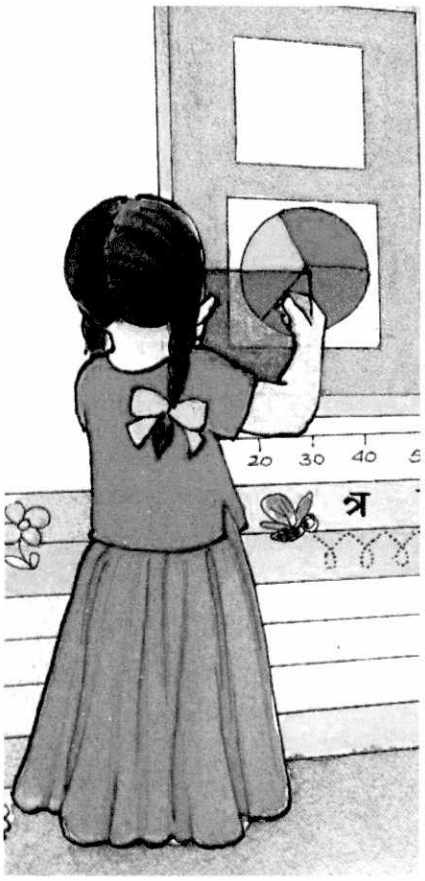
The child in the centre is the Sun. The children in the outer circle are each an Earth. They must rotate counter-clockwise and turn their backs to the "SUN" when the child in the centre calls "Night" When the child calls "Day" they must slowly rotate and face the "Sun" . Do this a few times throughout the year.

While the children are chanting, "Earth" closes her eyes and turns slowly with one hand pointing towards the circle of children. As she rotates slowly with eyes closed (night), she continues to point with her hand. At the word "day", she stops and opens her eyes. Then the child who is pointed at becomes the "Earth". The original "Earth" joins the circle.

Discuss with children: The child in the centre represents who? Yes earth. Her eyes are closed so it is night-time. When "Day" is repeated then the eyes are opened. Now it is day-time.

Orbits using pebbles on a soft ground

04 Colour Teasers



Introduction

Colour adds spice to life. Many school environments are dull and colourless. Other schools have too much colour and the effect is overwhelming and distracting. Colour in small doses is appealing and adds to the attractiveness of the school environment. If we observe nature, the predominant colours are the multitude of greens of fields and trees and the many shades of browns, blue and white. Only occasionally is there a riot of colours seen in an evening monsoon sunset or an avenue of *Gulmohur* in bloom.

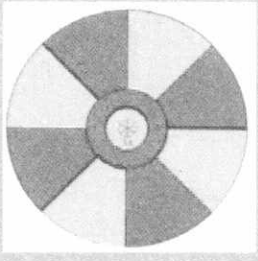
Suggested Activities

1. Fan Colour Wheels
2. Panels of *Katran* of Clothes
3. Window Colour Panel
4. Sun Catcher
5. Room Party
6. Balloons on Fan

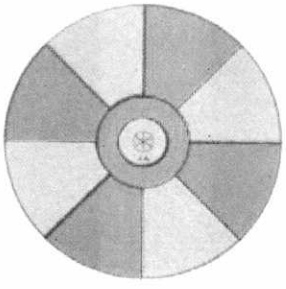
Teaching-Learning Activities

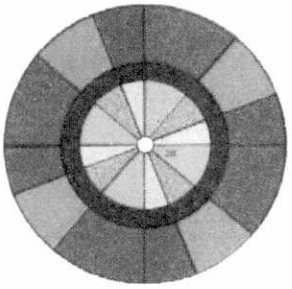
Activity 1: Fan Colour Wheels

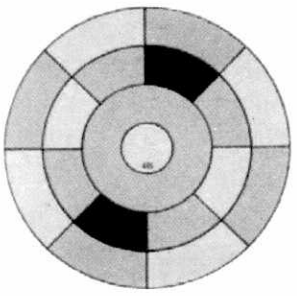
Classes III, IV, V



Children can make a circular colour panel, as shown in the illustration. They can experiment with shades of the same colour, with primary colours, with black and white. Children will observe what happens when the fans turn and when the fans slow down.

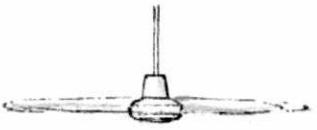






Fan colour wheel can be made simple to complex with classes I to VIII

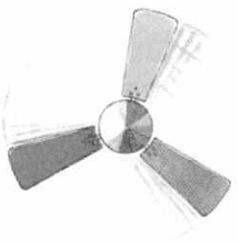
Teacher's Role



Children, and all of us, are attracted to colours. Colours can be bright, loud, shocking, violent, gentle, quiet, warm and peaceful. It is nice to paint your classroom a light pastel green or yellow for warmth. Other colours should come from the children's art work, the posters, the educational aids, library books and motifs, coloured chalk used to make patterns on the grid board and so on.

The teacher will play a supportive role as he helps children to plan activities, as he makes sure those supplies are available and as he draws children's attention to beauty in nature and beautiful creations.

When an art work, or collage or colour wheel are made in the class, has the teacher helped children to clean up the room and put the waste in garbage pails? After that where does the garbage go? On to the road? For composting? To the *kabari walla*?



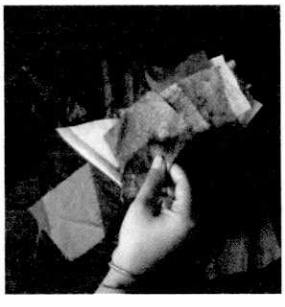
Objectives

1. To create an attractive environment.
2. To please children and have a sense of pride in their school.
3. To give a variety of visual experiences to children.
4. To catch the movement of sunlight and bring colour into the room.

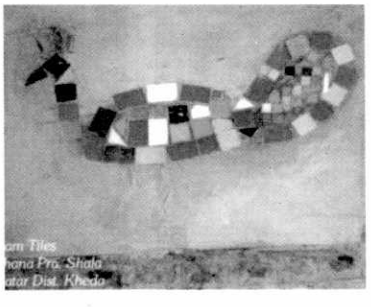
Activity 2: Panels of *Katran* of Clothes

Classes II, III

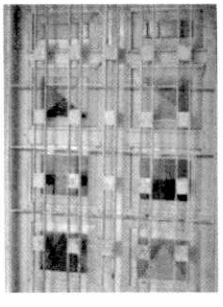
Appreciation of colours can also happen through small art projects. Ask children to collect a lot of *katran* from the tailor. When several boxes of *katran* have been collected, these *katran* can be used for colourful collages. Once the many shades of blue are collected a panel of blue can be made starting with the lightest shade and slowly adding on shades that become darker and darker. The same thing can be done with all the other colours. These panels can then make a lovely display in the entrance of the school or in the classroom.

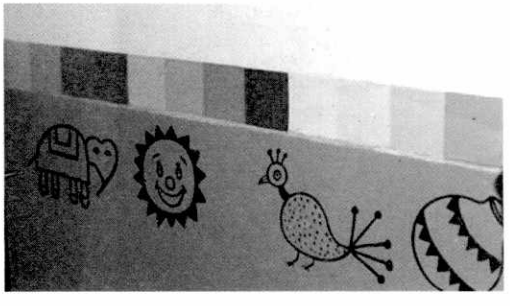


Using cloth Katran



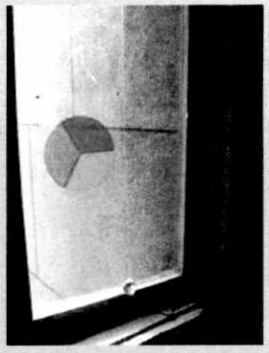
Multi-coloured tiles





Panel of colour shades

Activity 3: Window Colour Panel



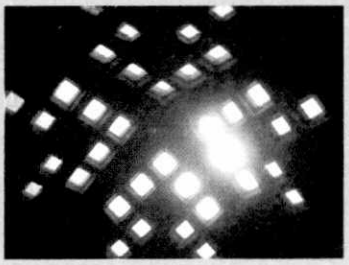
All Classes

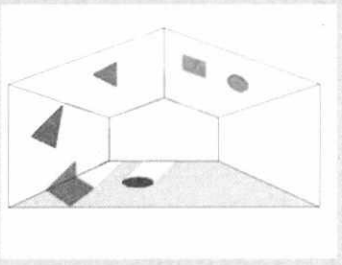
Window colour panels can be made by painting the surface of windows. Either contrasting colours or a graduation of colours within the colour spectrum can be painted on the glass surfaces.

Activity 4: Sun-Catchers

All Classes

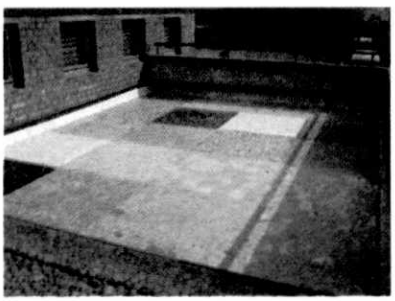
Sun-catchers are painted glass objects like birds, flowers, or leaf patterns. They are hung in windows. As the wind blows, these sun-catchers slowly swing around and catch the rays of the sun that beam into the room. They add to the beauty and aesthetics of a classroom. They can be purchased in gift shops for ₹ 40 or ₹ 50.





Another type of sun-catchers are coloured fibreglass sheets that are put in sloped tin or asbestos roofs that do not have another room on top. If a sloped roof needs repair, these coloured panels can be added. The colour will add diffused light and enchantment to a class room.

Space for Notes:



Using waste coloured tiles to make mosaic of shapes

Panel of coloured tiles in a hop-scotch

Activity 5: Room Party

All classes

At the beginning of the school year, children may like to have a "room party". The purpose is to have an aesthetically pleasing and beautiful classroom. They can plan on ways to decorate their class room. The teacher may need to guide the discussion and make a list of suggestions but the final decision should be the children's. A small collection of money could purchase a vase for flowers, or a sun-catcher. The "room" then gets a gift!!!

Children often bring flowers for the teacher. This can become a lovely tradition if the teacher puts these flowers in a shallow bowl or a vase, for all to see.

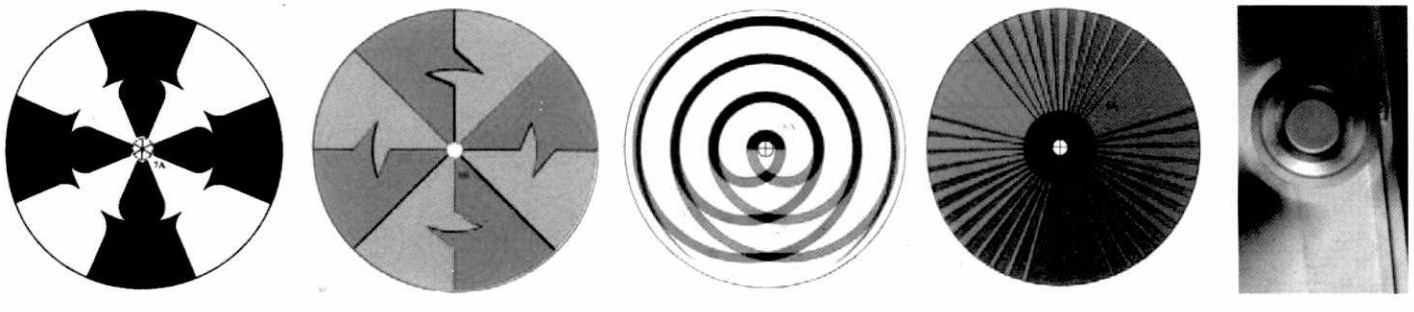
Some kites can be hung from the roof. An old pail with holes in it can be decorated and used as a dustbin. Local pottery or local stoneware, local weaving or local hand made toys can be displayed. These types of displays help children to appreciate craft work done in their region.

At times of festivals older children can be asked to decorate their school with the *rangoli* of the region.

Activity 6: Balloons on Fan

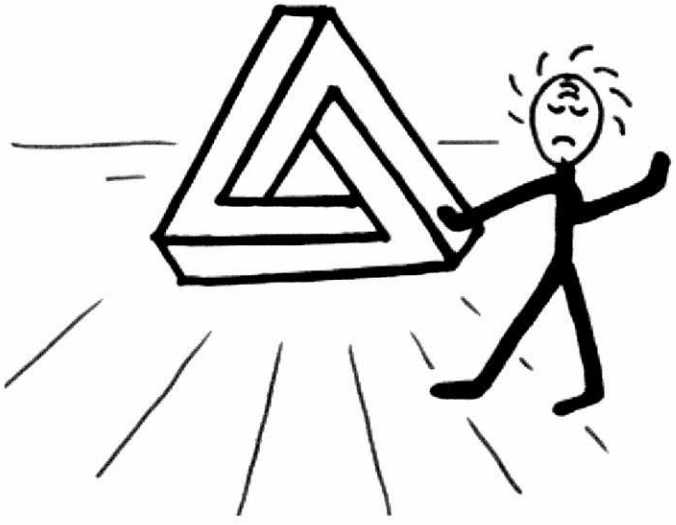
All classes

Along with colour wheels on the fans, it is nice to make changes by attaching three different coloured balloons onto a fan. Six small paper or cloth streamers about 10cm long also are attractive. The streamers must not be too long or they will get caught in the fan.



Ideas for fan colour wheels. These can be made by children and pasted as stickers also

05 Visual Illusions



Introduction

What are Visual Illusions on walls?

Children and all of us are fascinated by optical illusions. We stop in our tracks when we see visuals that do not follow patterns we see in our daily life. They arouse our curiosity. Can this be possible? It certainly has been possible to draw it. Do our eyes deceive us? They impel us to look at pictures or situations in a very different way.

What is happening here?

Suggested Activities

1. Exploring and Discovering Visual Illusions.
2. Sharing the Visual Illusions with Others.

Teaching-Learning Activities

Activity 1: Exploring and Discovering Visual Illusions

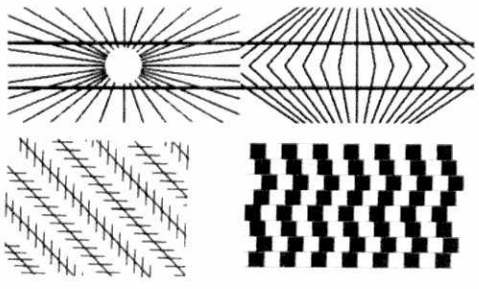
All classes

There are two types of illusions - Impossible illusions and Deceptive illusios. Children can be asked to explore these visual illusions and encouraged to discover the science behind it. This can be done by using mearusing scales, discussions with peer groups and teachers.

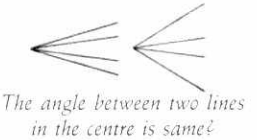
Activity 2: Sharing the Visual Illusions with Others

All classes

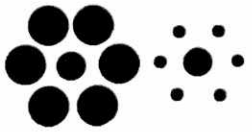
Children can be asked to find more such illusions in children's magazines. These can be hung on pin-up boards as a source of stimulation and enjoyment. If you use internet, there are many visual illusions that can be downloaded from the internet and printed out, including ones that seems to move. These can be hung on display boards and enjoyed.



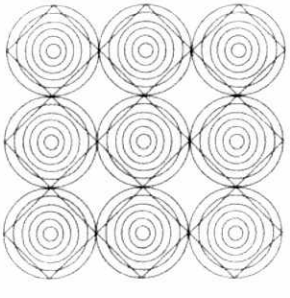
Are these lines parallel?



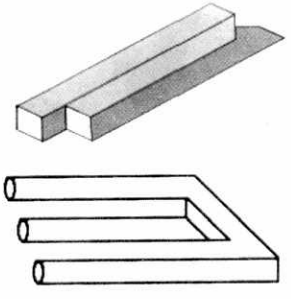
The angle between two lines in the centre is same?



Is the circle in the center bigger on the left or the right?



Are the lines straight?



Is this possible?

⇒ **Impossible Illusions**

⇒ **Deceptive Illusions**

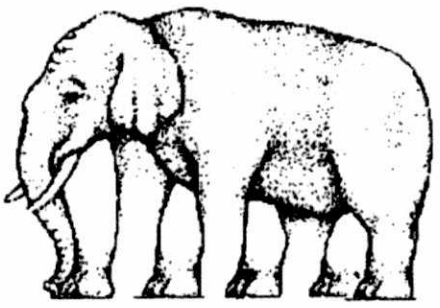
Teacher's Role

As teachers we need to constantly introduce children to magic and wonder in the world.

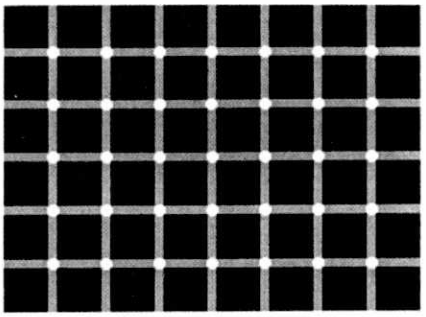
Impossible and Deceptive Illusions can easily be painted on walls or on doors or in cosy corners where children play outside.

Objectives

1. To arouse curiosity.
2. To sharpen visual perception.
3. To understand that our senses can play games on us.
4. To have fun sharing and discussing.
5. To experience and promote divergent and lateral thinking.
6. To develop positive dispositions towards school as a stimulating and enjoyable place.

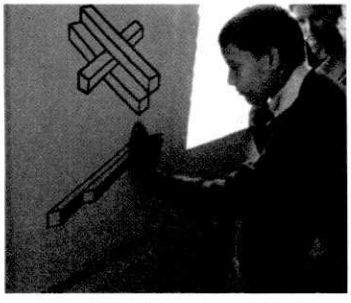


Impossible illusion



Deceptive illusion

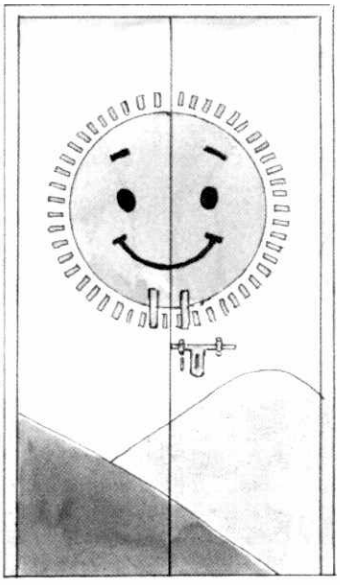
Space for Notes:



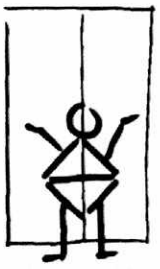


Children using illusions in a corridor space

06 Symmetry Around Us



Introduction



Although symmetry is taught in textbooks, it needs to be observed in the world around us. Children can be helped to find symmetry in windows, on doors, on the blackboard, in leaves, etc.

Suggested Activities

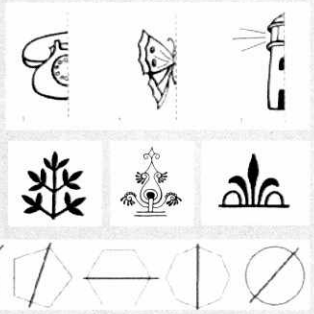
1. Symmetry in Objects
2. Symmetry in Leaves
3. Symmetry in the School Building
4. Symmetry with Mirrors
5. Symmetry in Alphabets

Teaching-Learning Activities

Activity 1: Symmetry in Objects

Classes II, III, IV

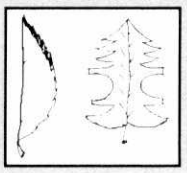
Arrange various objects, such as a vase, a pot, a pencil, a pair of goggles, a stapler, a glass, to be presented to the class. Ask children which of the objects have an imaginary line that can show a symmetrical or equal half of these objects. Explain that this imaginary line is called the line of symmetry. With your finger make two lines across a pot one line is the line of symmetry; the other line divides the pot in the middle. Ask which line is the line that equally divides the pot? Then ask them: What is this line called?

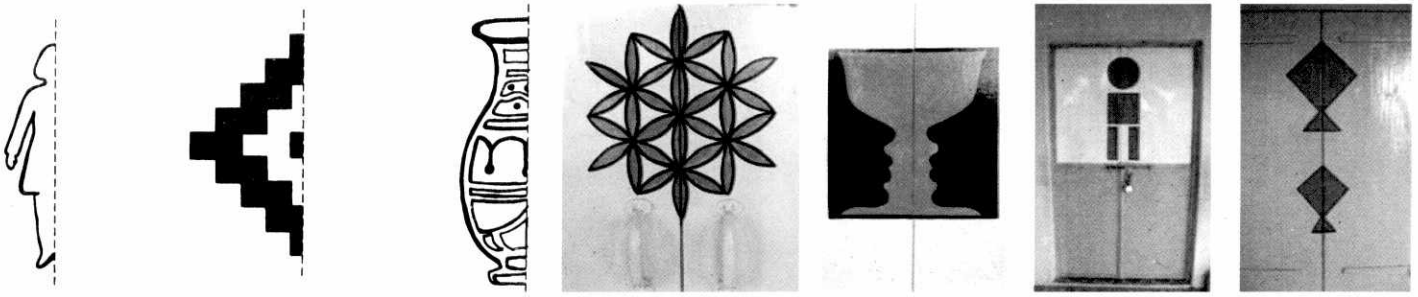


Activity 2: Symmetry in Leaves

Classes II, III, IV

The next day, you can show leaves to children and ask them to find the line of symmetry. Then ask them to go outside for ten minutes and find leaves to bring back to the class. Fold these leaves on the line of symmetry.





Many objects and pattern around us are symmetrical along an imaginary line of symmetry. Hence these can be painted on double shutters of doors and almirahs

⇒ **Symmetry in the Built Element**
⇒ **Symmetry in Mirror Images**

Teacher's Role

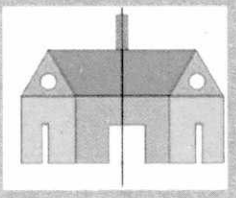
The teacher needs to play an active role in teaching symmetry. Keeping in mind the age of the children, lessons will need to be prepared to help children observe and understand symmetry. If you do not have mirrors, small mirrors can be purchased from the market so that children can make their own mirror inverted images. *Darpan Se Boojho* is an inexpensive book with a mirror - see annexure-I for details.

Objectives

1. To use built elements to experience symmetry.
2. To add visuals to built elements that have symmetry.
3. To experience symmetry using mirrors.
4. To understand what is symmetrical and what is not.
5. To learn to draw lines of symmetry through a figure.
6. To learn to draw a symmetrical figure from half a figure.

Activity 3: Symmetry in the School Building

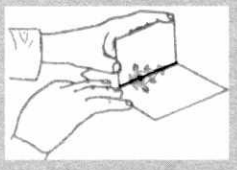
Classes III, IV, V



On the third day, search for lines of symmetry in the built environment. It may be a window grill, a door, a gate, or even entire block of school building.

Activity 4: Symmetry with Mirrors

Classes III, IV, V



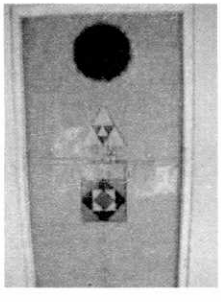
a) After children have had experiences of searching for symmetry ask them to use a double shutter door and draw their own symmetrical figures and designs on the door. When the two door shutter are closed the complete figure will appear.

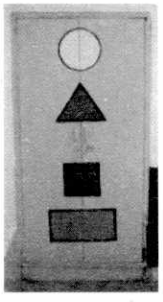
b) You may have mirrors that are permanently fixed on the corners of walls. It is fun to have children put objects in front of these mirrors and look at the image. If you have mirrors at different angles what happens? Let the children experiment.

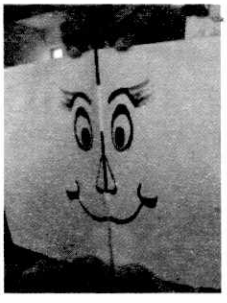
Activity 5: Symmetry in Alphabets

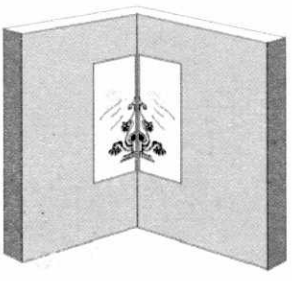
Classes III, IV

Look at letters of the English alphabet. Many of them have lines of symmetry. Write them on a chalk board and draw the lines of symmetry. Search for lines of symmetry in the language alphabet.









Symmetry seen through mirrors fixed on flat wall or on the corners